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Browns Slough

Summary of 2015 Surface Water Monitoring Program Results

Washington State Department of Agriculture

Natural Resources Assessment Section

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Introduction

The Washington State Department of Agriculture has monitored pesticide concentrations in surface water throughout Washington since 2003. WSDA takes water samples during the typical pesticide use season (March through September). In 2015, fourteen sites were monitored in Washington, four in Skagit County. State and federal agencies use this data to evaluate water quality and make exposure assessments for pesticides registered for use in Washington State.

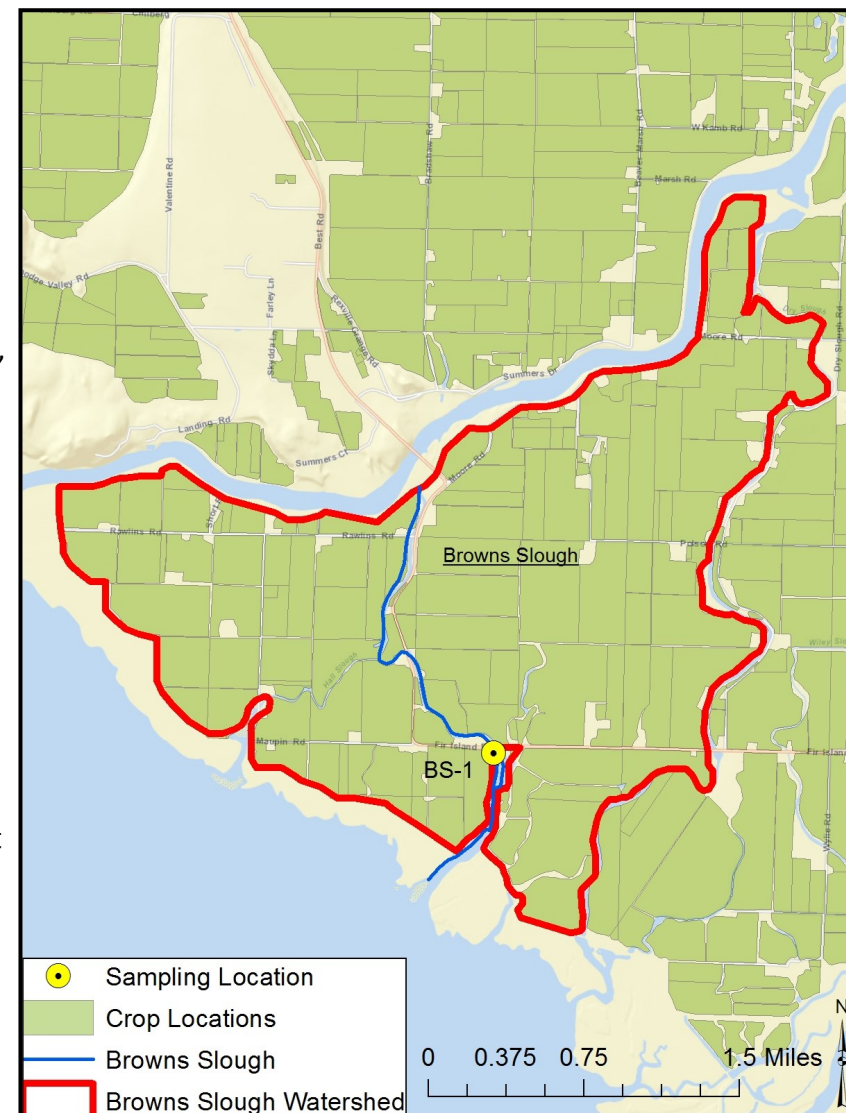
Study Area

WSDA has sampled water from Browns Slough from 2006 through 2015. The watershed drains about 3,400 acres of farmland, and land use is almost completely agricultural. The main crops are field corn, potatoes, cereal grains, and vegetable seeds. Browns Slough provides habitat for chinook, coho, chum, steelhead, and pink salmon*. The Skagit Valley (and the Browns Slough watershed) is also a crucial area for migratory waterfowl including trumpeter swans, tundra swans, snow geese, and other birds.

* Washington State Department of Fish and Wildlife

Sampling Details

- Sampled water for 20 weeks in 2015 from March 9 through July 20.
- Water samples were tested for 206 chemicals: current and legacy insecticides, herbicides, fungicides, rodenticides, wood preservatives, and pesticide degradates.
- Sample analysis for pesticides and total suspended solids was conducted at Manchester Environmental Laboratory in Port Orchard, WA.
- General water quality parameters; dissolved oxygen, conductivity, pH, water temperature, and streamflow were measured at every sampling event.
- Air and water temperature (measured every 30 minutes) was monitored for the entire sampling season.



This table shows the pesticides detected, with dates and concentrations. They are color coded to identify which assessment criteria were surpassed. The assessment criteria used here are state and federal water quality criteria, reduced by half for safety. This 0.5 safety factor is used to make sure the criteria protect aquatic life and water quality issues are found early. Watersheds with detections above the criteria are prioritized for more monitoring and educational outreach. See <http://agr.wa.gov/PestFert/natresources/SWM> for more information.

Assessment Criteria		Month and Day		Mar			Apr					May				Jun					Jul		
		Pesticide Name	Use*	9	18	23	1	6	15	20	29	4	11	18	27	2	8	16	22	30	6	15	20
May affect fish survival at sensitive life stages		2,4-D	H				0.082	0.054							0.14								
		AMPA	H	--	--	--	--	--			0.12	0.245	0.22	--	--	--	--	--	--	--	--	--	
Additional level of protection for endangered species		Azoxystrobin	F		0.052	0.024					0.008												
		Boscalid	F											0.13				0.36					
May affect invertebrate survival		Bromacil	H															0.039					
		Dacthal (DCPA)	H	0.48	0.12	0.18	0.19	0.15	0.4	0.063	0.25	0.1	0.07			0.054							
Nearing a pesticide state water quality standard		Dichlobenil	H	0.006	0.051	0.016	0.013			0.015	0.013												
		Difenoconazole	F		0.007																		
		Diuron	H		0.005			0.005		0.005	0.006	0.005											
May affect fish growth or reproduction with prolonged exposure		Fludioxonil	F						0.037								0.15						
		Glyphosate	H	--	--	--	--	--	0.11	0.067	0.074	0.096	0.081	--	--	--	--	--	--	--	--	--	
May affect invertebrate growth or reproduction with prolonged exposure		Imazapyr	H						0.012	0.013	0.012												
		Imidacloprid	I-N		0.011	0.016																	
		Metalaxyl	F															0.07					
May affect aquatic plant growth		Metolachlor	H	0.029	0.053	0.046	0.038		0.11	0.52	0.041	0.033	0.032	0.031									
		DEET	IR										0.036										
May affect aquatic plant growth or reproduction with prolonged exposure		Simazine	H		0.22	0.068																	
		Sodium bentazon	H		0.082																		
Below all identified criteria		Sulfentrazone	H														0.068						
		Tetrahydrophthalimide	D-F															0.49					
No published criteria available		Temperature	N/A	52.61	51.49	51.19	53.04	51.51	51.71	63.32	55.89	64.00	65.73	66.74	--	62.55	79.65	70.03	54.43	77.54	74.66	75.65	78.76
		Dissolved oxygen	N/A	8.88	3.55	8.40	9.49	11.27	9.48	8.92	7.37	8.89	8.63	8.90	6.98	5.77	4.29	6.52	6.07	5.31	4.32	5.54	5.85
Not detected (below detection limit)		Precipitation	N/A	0	0	0	0	0	0	0	0	0.08	0	0	0	0.2	0	0	0	0	0	0	0
		Streamflow	N/A	6.68	16.11	17.24	12.37	9.183	4.978	--	5.483	12.01	4.35	5.355	2.01	0.952	--	--	--	--	--	--	--
No Data	--	Total suspended solids	N/A	10	9	7	6	5	6	12	16	12	17	11	15.5	12	30	19	11	7	11	8	13
		‡ C: Carbamate, D: Degradate, F: Fungicide, H: Herbicide, I: Insecticide, L: Legacy pesticide, M: Multiple, N/A: Not applicable, N: Neonicotinoid. †Units are as follows: pesticides, µg/L; temperature, °F; dissolved oxygen mg/L; percipitation, week total inches; streamflow, cfs; and total suspended solids, mg/L. Bold: Indicates a temperature or dissolved oxygen value above state water quality standards.																					

Results Summary

- There were 64 total pesticide detections in Browns Slough, none of the concentrations were above the assessment criteria. Most detections were early in the growing season in (March-May).
- Dacthal and metolachlor were the most frequently detected compounds.
- Common products containing dacthal are Dacthal W-75 and Dacthal Flowable herbicide.
- Common products containing metolachlor are Stalwart, Tailwind , Parallel, Matador, Drexel Me-Too-Lachlor.
- Dacthal and metolachlor are pesticides of concern in Washington State. Both of these pesticides have been detected in past years in Skagit County above aquatic health criteria.
- Browns Slough had fewer detections than the other Skagit Valley sites.
 - Indian Slough: 124 detections, 0 exceedances,
 - Upper Big Ditch: 304 detections, 2 exceedances,
 - Lower Big Ditch:203 detections, 4 exceedances.

Recommendations

- Read and follow label directions to protect water quality.
- Eliminate drift and runoff to adjacent surface water.
- Implement best management practices , including conservation buffers, vegetative filter strips, sediment basins, and setbacks from water.
- Review pest control needs and select appropriate and less-toxic pesticides.
- Manage irrigation to prevent runoff, and check the weather forecast before application to prevent runoff due to rainfall.
- Maintain, inspect, and calibrate application equipment.